STUDIES ON OXYGRYLIUS CASEY (COLEOPTERA: SCARABAEIDAE: DYNASTINAE)

By Alan Hardy[1]

Oxygrylius was first proposed as a genus by Col. Thomas Casey (1915) for three species, two described as new at that time. He included in this genus the species first described in 1856 by LeConte as *Ligyrus ruginasus*. Since Casey's paper, both of his species have been synonymized with *Oxygrylius ruginasus*. *O. pimalis* Casey was placed in synonymy by Blackwelder (1944), while Saylor (1946) considered *O. peninsularis* Casey conspecific with *O. ruginasus* (LeConte). There is no indication that genitalia were extensively studied in either process, although Saylor does figure the aedeagus of *O. ruginasus*.

In the 1224 specimens of *Oxygrylius* studied, the genitalia of 635 males were examined and form the basis for the classification presented here. Because of this work, I consider *Oxygrylius* Casey, 1915, to be a subgenus of *Bothynus* Hope, 1837.

Specimens were borrowed from several institutions to supplement the specimens at hand. I am indebted to the following for loans of material in their care, and for suggestions on the project: O. L. Cartwright, United States National Museum; H. F. Howden, Canadian Department of Agriculture; H. B. Leech, California Academy of Sciences; E. L. Sleeper, California State College at Long Beach; R. Snelling, F. Truxal and C. Hogue, Los Angeles County Museum. I would especially like to thank Dr. H. F. Howden, who suggested the project, and Dr. E. L. Sleeper, who made suggestions that aided in the solution of some of the problems encountered. I would also like to thank O. L. Cartwright and P. J. Darlington (Museum of Comparative Zoology, Harvard University) for the information on the types in their care.

Bothynus subgenus *Oxygrylius* Casey, NEW STATUS

Oxygrylius Casey, 1915:208.

Type of Subgenus: Ligyrus ruginasus LeConte, 1856, by original designation.

Morphology and Classification. In the original description of *Oxygrylius,* Casey gave the following characters as significant in distinguishing his new genus from *Ligyrus* Burmeister, 1847 (U. S. species now *Bothynus* Hope, 1837): "The single acute denticle of the clypeal apex and the more or less reduced posterior tooth of the mandibles . . . the thoracic fovea is constantly larger, deeper, and is always at least partially rugose at the bottom."

One male specimen in the Los Angeles County Museum Collection (California, Kern Co., McKittrick 29-VIII-'49) has a single tooth on the apex of the clypeus, yet the rest of the body (including the aedeagus) is

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that of a specimen of *Bothynus gibbosus obsoletus* LeConte. The specimen is from an area where at present no *Oxygrylius* have been taken and so evidently does not represent a hybrid, but it probably represents a mutation of a single character, showing the close relationship of the two groups. No other malformations of the clypeus have been noted.

There is variation between the species of the most closely related group *(Bothynus)* with respect to the thoracic fovea, and the character as seen in *Oxygrylius* is not extreme.

The male genitalia of *Oxygrylius* and *Bothynus* show many similarities and are not of such difference to support separate genera on their own merit.

For these reasons I consider *Oxygrylius* not distinct enough to be considered a full genus and recommend that it be given subgeneric rank under *Bothynus* Hope, 1837.

Oxygrylius appears to contain two sibling species, recognizable mainly by the genitalia of the males, which appear to hybridize along the areas of contact; such hybridization is apparent in the male genitalia (see fig. 3). Eleven specimens have been examined which are considered hybrids. They bear the following data: CALIFORNIA: *San Bernardino Co.:* Providence Mountains (3 males); "Ibanpah" (Ivanpah) Mountains (2 males); Needles (1 male). *Riverside Co.:* Joshua Tree National Monument, (Cottonwood Springs) (1 male); Chuckawalla Mountains (Red Cloud Mine) (2 males); Chuckawalla Mountains (Irish Wash) (2 males).

Oxygrylius has been recorded as a pest in Idaho (Essig, 1936), but this was probably a misidentification of *Bothynus gibbosus* (DeGeer), perhaps being older specimens with the two clypeal teeth worn off.

Ritcher (1944) described the larvae of *Oxygrylius ruginasus* from two specimens taken in Mississippi. These may have been examples of another species of Dynastinae, possibly a *Bothynus,* as *Oxygrylius* is not recorded from east of eastern Texas.

Bothynus (Oxygrylius) ruginasus (LeConte), NEW COMBINATION
(Figs. 2, 4)

Ligyrus ruginasus LeConte, 1856:20; Horn, 1875:143; Bates, 1888:316.
Oxygrylius ruginasus (LeConte): Casey, 1915:209; Ritcher, 1944:27, fig. 79; Blackwelder, 1944:255; Saylor, 1946:44.
Oxygrylius pimalis Casey, 1915:209.

Length 14 mm. to 21 mm., width 7 mm. to 11 mm. Oblong, shining, reddish-brown. Clypeus with single medial tooth. Clypeus and front rugose, the rugae formed by irregular pitting, pits becoming scattered at occiput, becoming separated by more than twice their own width. Frontal carina thinning medially and laterally, not quite extending to lateral edges of front. Pronotum convex, anteriorly and laterally margined. Posterior edge slightly sinuate, not margined. Apical angles acute, posterior angles rounded. Anterior margin with well developed median tubercle, greater than clypeal tooth. Posterior to this tubercle is a deep fovea, the surface having a punctation similar to that on front. Pits becoming scattered at edges of fovea, until they are separated by at least their own diameters on rest of pronotum.

Pits at margins becoming confluent, resembling in texture the front and fovea. Scutellum smooth with a few scattered punctures. Elytra longer than wide, about twice as long as pronotum; fine punctures scattered throughout and mixed with annular punctures, few of which are confluent, the coarse punctures finer and denser posteriorly. Pygidium moderately punctate throughout, the punctures generally separated by at least their own diameters, laterally denser in corners. Margin on ventral edge widest at lateral angles of pygidium and just laterally of medial point; narrower between (fig. 4). Underside quite hairy, prosternal process completely so. Anterior tibia tridentate, emarginations between teeth deep, with pits outside longitudinal row of setigerous punctures. Apex of hind tibia slightly flared, its width approximately one-third to one-half length of tibia measured along inner edge. Aedeagus distinct from other species, but with minor individual variations (fig. 2). Female differs from male in having pygidium more flattened, and in not having an emargination in the last abdominal sternite.

TYPE: Museum of Comparative Zoology, Harvard University, LeConte Collection.

TYPE LOCALITY: Ringgold Barracks, Texas (near Rio Grande City, Starr County).

SPECIMENS EXAMINED: 700 (351 males, 349 females).

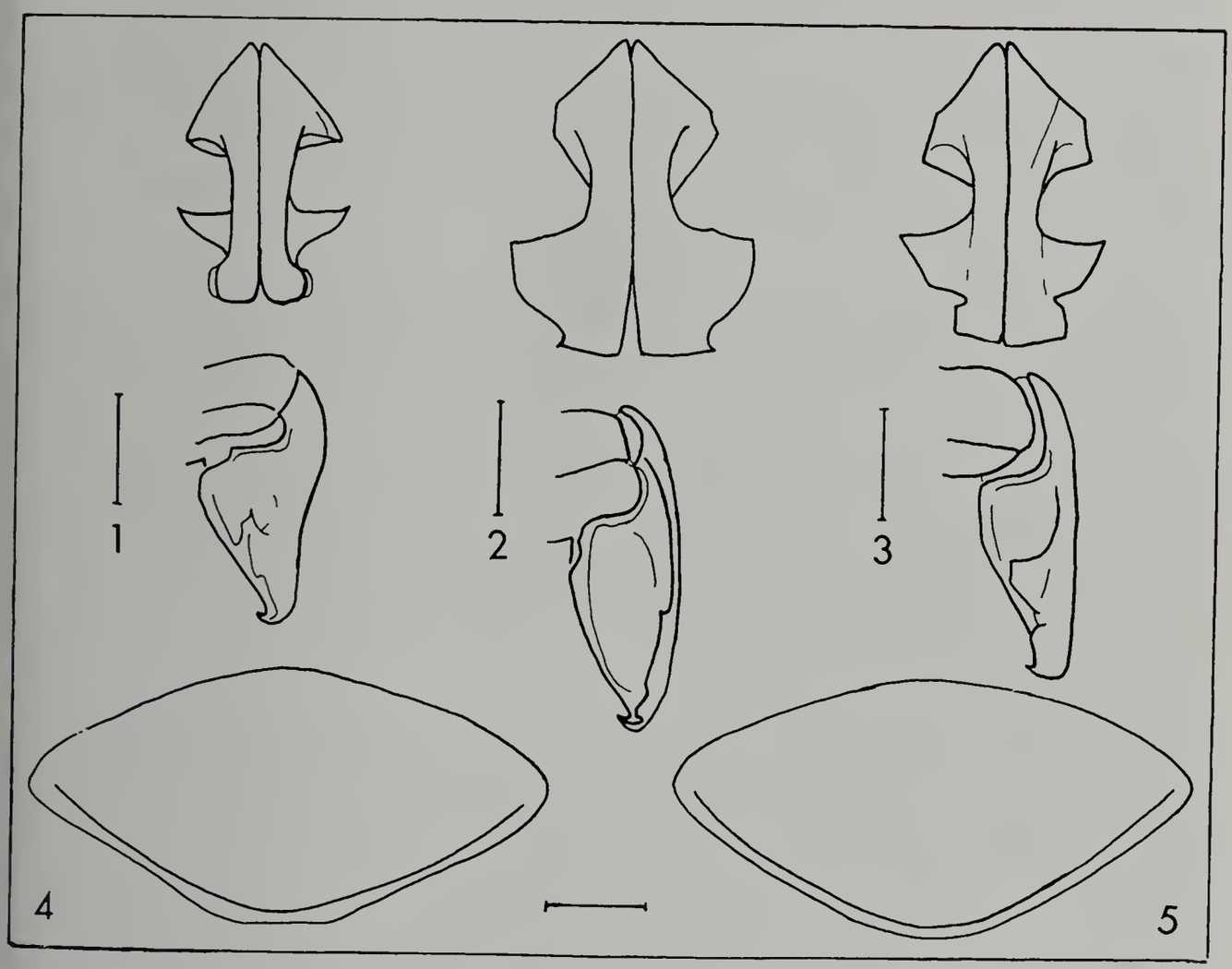
DISTRIBUTION: Sonoran desert and drier areas of southwestern United States (except most of California), and northern and western Mexico.

UNITED STATES. CALIFORNIA: *San Bernardino Co.;* Needles; Providence Mountains. ARIZONA: "Ariz."; "Canyon"; "Canyon Lake"; Safford; 2 mi. w. Magna; Santa Catalina Mountains (Pepper Sauce Canyon); Baboquivari Mountains. *Cochise Co.:* Cochise; Portal; Lowell; Whetstone Mountains (Dry Canyon Sands Ranch); Huachuca Mountains; Chiricahua Mountains. *Gila Co.:* Globe; Miami; Pinal Mountains. *Graham Co.:* Geronimo. *Greenlee Co.:* Clifton. *Maricopa Co.:* Wickenburg; Phoenix; Arlington; Gillespies Dam; Gila Bend; Higley. *Pima Co.:* Organ Pipe Cactus National Monument (Quitobaquito, W. Bates Well, Walls Well Road, Hockers Well, Headquarters); Santa Catalina Mountains (Agua Caliente Ranch); Tucson; San Xavier Mission; Ajo Mountains (Alamos Canyon). *Pinal Co.:* Apache Junction; Oracle. *Santa Cruz Co.:* Santa Rita Mountains (Madera Canyon); Nogales; "Washington Mountains near Nogales." *Yavapai Co.:* Prescott. *Yuma Co.:* 63 mi. e. Yuma. NEW MEXICO: Big Dry Creek. *Doña Ana Co.:* Pyramid Peak; Mesquite (?). *Hidalgo Co.:* Lordsburg. *Sierra Co.:* 16.7 mi. s. Truth or Consequences. TEXAS: "Cameron Co."; "Welder Wildlife Refuge (near Sinton)." *Brewster Co.:* Big Bend National Park (Maverick, Kingsville, Boquillas, Panther Junction, Oak Springs, Chisos Basin, Hot Springs); Lajitas; Terlingua. *Cameron Co.:* Esperanza Ranch (Brownsville). *Duval Co.:* San Diego. *El Paso Co.:* El Paso. *Hudspeth Co.:* Sierra Blanca. *Kimble Co.:* Junction City. *Val Verde Co.:* Del Rio. *Webb Co.:* Laredo.

MEXICO. "Sonora"; "Libertad"; "Nu Laredo." CHIHUAHUA: Santa Eulalia. COAHUILA: Montlave; Boquillas del Carmen. DURANGO: Lerdo. NAYARIT: 21 mi. s. Acaponeta. NUEVO LEON: 5 mi. s. Monterrey; Apodeca. SINALOA: Venoido; "Venedie" (Venodio?); Los Mochis; Topolobampo; 10 mi. s. Guamachil; 35 mi. n. Guamachil; 18 mi.

n.e. San Blas; Mazatlan; 5 mi. n. Mazatlan; 7 mi. n. Mazatlan; 8 mi. n. Mazatlan; ½ mi. s. Villa Union; 3 mi. n.e. Villa Union; 26 mi. n.e. Villa Union; Rio Piaxtala (1 mi. w. Mex. #15); Culiacan; Vinaterio. SONORA: Rio Mayo; "San Bernardino, Rio Mayo" (San Bernardo?); Hermosillo; 36 mi. n. Hermosillo; Posa; 25 mi. s. Llano; Campo Utah; San Carlos Bay; Louis; Saric; Ciudad Obregon; Navajoa; 1 mi. n.w. Navajoa; La Aduana; 2.1 mi. w. Alamos; Magdalena; Esperanza; Valle del Yaqui; El Oasis (45 mi n. Hermosillo).

REMARKS: The genitalia of Casey's *pimalis* seem to show no difference from the specimens from Texas, and the author agrees that this should be considered a synonym of *B. (O.) ruginasus*. This species is taken from May to December and is apparently most common in August. Individuals of this species are readily attracted to lights.



FIGURES 1-5. *Bothynus (Oxygrylius)* spp. (Scale equals 1 mm.) 1—*peninsularis*, male genitalia, dorsal and lateral views. 2—*ruginasus*, male genitalia, dorsal and lateral views. 3—Hybrid of *Bothynus* spp., male genitalia, dorsal and lateral views. 4—*ruginasus*, male pygidium. 5—*peninsularis*, male pygidium.

Bothynus (Oxygrylius) peninsularis (Casey), NEW COMBINATION
(Figs. 1, 5)

Oxygrylius peninsularis Casey, 1915:209.

This species is nearly identical to the preceding, except in the male genitalia (fig. 1) and the following variable character: Ventral margin of the pygidium usually widest only at the lateral angles, becoming increasingly narrower medially (fig. 5).

TYPE: United States National Museum 48598, Casey Collection.

TYPE LOCALITY: San Jose del Cabo, Baja California Sur.

SPECIMENS EXAMINED: 513 (303 males, 210 females).

DISTRIBUTION: Southern California and peninsula of Baja California.

UNITED STATES. NEVADA: Lake Mead. CALIFORNIA: "Cal." *San Bernardino Co.:* "Ibanpah Mountains" (Ivanpah Mountains?); Providence Mountains. *Riverside Co.:* Palm Springs; Joshua Tree National Monument (Sunrise Well, Lower Covington Flats, Smithwater Wash, Pinto Wash Well, Cottonwood Springs, n. side Eagle Mountain); Chuckawalla Mountains (Irish Wash, Red Cloud Mine). *San Diego Co.:* Borrego; San Felipe; Mason Valley; Vallecito. *Imperial Co.:* Kane Springs; San Felipe Creek (near Junction Carrizo Creek).

MEXICO: BAJA CALIFORNIA NORTE: 10 mi s. Catavina; Valle Trinidad; e. base Sierra de Juarez below La Rumerosa. BAJA CALIFORNIA DEL SUR: La Paz; 15 mi. w. La Paz; 25 mi. w. La Paz; Palmanita, Purissima; Las Parras; Comondu; 10 mi. s.w. Comondu; 20 mi. n. Comondu; Triunfo; 6 mi. n. Triunfo; San Jose del Cabo; 10 mi. s.w. San Jose del Cabo; Miraflores; 5 mi. s. Miraflores; 4 mi. w. San Ignacio; 15 mi. n. San Ignacio; 45 mi. n. San Ignacio; 50 mi. n. San Ignacio; Canipole; 10 mi. s.w. Canipole; Cabo San Lucas; San Vanancio; Coyote Cove (Conception Bay); San Francisquito Bay; 25 mi. n. Santa Rosalia; 6 mi. s.w. Santiago; 4 mi. n. Todos Santos; 3 mi. n. San Pedro; 5 mi. w. San Bartolo; 50 mi. s. El Arco; Ruffo Ranch (Isla Cerralvo).

REMARKS: The adults of this species are active from late June to late December, and are taken most frequently in August and September. A specimen kept in captivity lived from late October to the summer months of the following season, in the adult stage, so apparently there is some overwintering by adults. Early records of this species may represent these adults. This species is frequently collected at lights. Evidently the adults spend the days in the soil, coming to the surface at night to fly about in search of mates.

Literature Cited

Bates, H. W.
1888. Biol. Centr.-Amer. Ins. Coleop. 2(2):1-432, 21 pls.

Blackwelder, R. E.
1944. Checklist of the coleopterous insects of Mexico, Central America, etc. Smithsonian Inst. Bull. 185, pt. 2., p. 255.

CASEY, T. L.
1915. A revision of the American species of Rutelinae, Dynastinae, and Cetoniinae. Mem. Coleop. 6:1-460.

ESSIG, E. O.
1936. Insects of Western North America. The Macmillan Co. Pp. 1-1035, illus.

HORN, G. H.
1875. Synonymical notes and description of new species of North American Coleoptera. Trans. Amer. Ent. Soc. 5:126-156, illus.

LECONTE, J. L.
1856. Notice of three genera of Scarabaeidae found in the United States. Proc. Acad. Nat. Sci. Phil. 8:19-25.

RICHTER, P. O.
1944. Dynastinae of North America with descriptions of the larvae, etc. Kentucky Agric. Expt. Stn. Bull. 467:1-56, 90 figs.

SAYLOR, L. W.
1946. Synoptic revision of the United States scarab beetles of the subfamily Dynastinae, No. 3: Tribe Oryctini (part). Jour. Wash. Acad. Sci. 36(2): 41-45, 1 fig.

DESCRIPTION OF A BRACHYPTEROUS FIREFLY FEMALE OF THE GENUS PHOTINUS (COLEOPTERA: LAMPYRIDAE)[1]

By JAMES E. LLOYD[2, 3]

In the revision of the genus *Photinus* by J. W. Green (1956) the females of seven of the 28 described Nearctic species were found to be brachypterous and the females of two more species were suspected to be so. No females of the species *P. frosti* Green and *P. tenuicinctus* Green were in collections at that time. On June 29, 1964, two females of *P. tenuicinctus* (fig. 1) were collected at Fayetteville, Arkansas.

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